

I (WE) CLAIM:

1. In a matching layer of an ultrasound transducer, the matching layer including a resin, an improvement comprising:
a hafnium filler.
2. The improvement of Claim 1 wherein the hafnium filler comprises hafnia powder.
3. The improvement of Claim 1 wherein the hafnium filler comprises only particles of less than 7 microns maximum dimension and the matching layer has an acoustic impedance of about 3-8 MRayl.
4. The improvement of Claim 3 wherein the particles are less than 1 micron and the acoustic impedance is less than about 4 MRayl.
5. The improvement of Claim 3 wherein the particles are greater than 5 microns and the acoustic impedance is greater than about 6 MRayl.
6. The improvement of Claim 3 wherein the acoustic impedance is about 5 MRayl.
7. The improvement of Claim 1 wherein the hafnium filler comprises 10-40% by volume of the matching layer.
8. The improvement of Claim 7 wherein the hafnium filler comprises 15-25% by volume of the matching layer.
9. The improvement of Claim 1 wherein the matching layer has an ultrasound strip velocity of about 1600-1900 meters per second.

10. The improvement of Claim 9 wherein the matching layer has an ultrasound strip velocity of about 1750 meters per second.
11. The improvement of Claim 1 further comprising:
the matching layer being an intermediate matching layer between an upper matching layer and a lower matching layer.
12. The improvement of Claim 1 wherein the matching layer has a maximum thickness of less than about 150 microns.
13. The improvement of Claim 1 wherein the resin with the filler comprises a castable material.
14. A method of manufacturing an ultrasound transducer with acoustic matching, the method comprising:
 - (a) loading a resin with a hafnium compound;
 - (b) casting the loaded resin with the hafnium compound; and
 - (c) positioning the cast material as a matching layer on the ultrasound transducer.
15. The method of Claim 14 wherein (a) comprises loading with hafnia powder at about 10-40% by volume.
16. The method of Claim 15 wherein (a) comprises loading with hafnia powder at about 15-25% by volume.
17. The method of Claim 15 wherein the hafnium compound comprises only hafnia particles of less than 7 microns maximum dimension and that the cast material has an acoustic impedance of about 3-8 MRayl.

18. The method of Claim 15 wherein the cast material has an ultrasound strip velocity of about 1600-1900 meters per second.
19. The method of Claim 15 wherein (c) comprises positioning the cast material between an upper matching layer and a lower matching layer.
20. An ultrasound transducer for acoustic use adjacent to tissue, the ultrasound transducer comprising:
 - a transducer element; and
 - an acoustic impedance matching layer adjacent the transducer element, the matching layer containing a hafnium compound.